DPA480
User's Manual

4 In - 8 Out Speaker Management System

Vers 1.0

Designed in Italy Assembled in China

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Introduction

DPA480 is the flagship of Marani' s digital speaker management systems. Designed for maximum versatility, it provides all the processing and control necessary for both live and fixed installation use. It offers 4 analog inputs, 8 analog outputs and 2 digital S/PDIF inputs, managed by a powerful DSP Engine, in addition to high performance 24 Bit AD/DA converters. Each input channel provides a choice of EQ with 5-band Parametric equalizer, Noise Gate function, Gain control and configurable Delay. In addition each input includes Pink/White noise internal generator which may be used for tuning sound reinforcement systems during installation. Each output offers up to 7-band of parametric equalization, in addition to the crossover filters which themselves provide slopes from 6dB/Octave up to 48dB/Octave. Each output path also features RMS compressor, Peak Limiter and configurable delay. The DPA480 supports a full matrix mixing mode where inputs may be routed/mixed in any ratio to any output. For remote configuration and control the DPA480 can be connected via Ethernet, USB or RS485. The control remote PC software allows simultaneous control up to 32 units, setting all parameters and showing real time levels.

Explanation of Graphical Symbols

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to humans.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying

Important safety instructions

- Read the information for use (User Manual).
- Please keep the User Manual in a safe place during the lifetime of the product. The User Manual forms an integral part of the product.
- Heed all warnings.
- Follow all instructions.
- Do not use this product near water (for example, in damp rooms or near a swimming pool).
- Clean only with dry cloth.
- Do not cover the heat sink. Install in accordance with the User Manual.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
- Protect the power cord from being walked on, pinched or damaged in any other way. Pay particular attention to plugs and the point where they exit from the Amplifier Unit.
- The product may only be used in accordance with the information provided in the User Manual. Before and during the usage of the amplifier please ensure that all recommendations, especially the safety recommendations in the User Manual, are adhered to. The Amplifier Unit is designed for the amplification of pulsed audio signals and the Amplifier Unit should only be connected to speakers with an average impedance that is not lower than the impedances specified in the User's Manual.

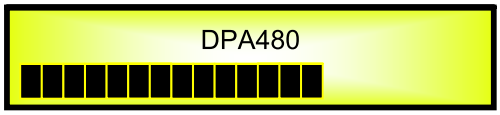
TipWizard

Described below are the functions of the front panel control buttons and encoders for the DPA480.

Getting Started

As soon as the DPA480 is turned ON the device model name will appear in the LCD screen:

and a status bar will show the progress of the DPA480 initialization process:



The DPA480 will start with a completely lat?condition of the all processes.
After the initialization, the DPA480 will show on the LCD that no Program/Preset has been created yet and that the program/preset loaded is an mpty?one, which means lat? condition for the all available processes.
First time activation will default to the first of the mpty Program?

Encoders and ENTER, ESC buttons

The DPA480 is equipped with 3 Relative Encoders + Push Button function, "NAV/PM1", "PM2" and "PM3", where the Push Button function is associated to the "ENTER", "ESC" and "UTILITY" controls.
These encoders allow you to navigate the user interface and edit sections of the processor. They allow the user to navigate within the screen for the selection of sub-menus, pages and parameters and to select the values to be assigned during the editing operations.

The "ENTER" and "ESC" functions allow the user to confirm or NOT confirm the operations performed by the encoders.

UTILITY, A/B/C/D and 1/2/3/4/5/6/7/8 buttons

The UTILITY button allows the User to enter the Sub-menus and set the general characteristics of the Processor. The A/B/C and D buttons allow the User to enter the Editing Menus of the Processor's Input Channels and buttons 1, 2, 3, 4, 5, 6, 7 and 8, allow the User to enter the Editing Menus of the Processor's Output Channels.

The A/B/C and D buttons as well as the 1, 2, 3, 4, 5, 6, 7 and 8 buttons have double functions dependent on the push and hold time.

When the A/B/C and D buttons are pushed and held for more than one second Input Channels A/B/C or D are either muted or unmuted. The red LED will illuminate when the Channel is muted. When the "MUTE" LED is OFF, then the related Input Channel is UN-MUTED.

A momentary push of the A/B/C and D buttons enters the Editing Mode for the Input Channels (see later for the Input Channel Editing details).
The blue "EDIT" LED will now be ON.

When the 1, 2, 3, 4, 5, 6, 7 and 8 buttons are pushed and held for more than one second the Output Channels 1, 2, 3, 4, 5, 6, 7 and 8 are either muted or unmuted. The red LED will illuminate when the Channel is muted. When the "MUTE" LED is OFF, then the related Output Channel is UN-MUTED.

A momentary push of the 1, 2, 3, 4, 5, 6, 7 and 8 buttons enters the Editing Menu for the Output Channels (see later for the Output Channel Editing details). The blue "EDIT" LED will now be ON.

DPA480 Menu and Sub-Menu Structures

As stated above, the start-up default screen is the following "Empty Program":

From this point, sub-menus are accessed using the UTILITY", "A/B/C/D", "1/2/3/4/5/6/7/8", "ENTER" and "ESC" buttons and all parameters and values are navigated by the "NAV/PM1", "PM2" and "PM3" encoders. Please refer to the following menu structures:

MENU "UTILITY MENU" [Access by pushing the "UTILITY" button]

NAV/PM1 Encoder
[to navigate between menus]

PM2 or PM3 Encoder
[to chose option, then ENTER to load it;
(*) indicates the selected option]

1 UTILITY MENU:.....
<< System Utilities >>

ENTER ⇓ ⇑ ESC

1.1 **SYSTEM UTILITY:**
<< Delay Units >>
ESC ⇐ ⇒ ENTER
Delay Units
Unit: Time(ms) *
Unit: Distance (m)

1.2 **SYSTEM UTILITY:**
<< Software Version >>
ESC ⇐ ⇒ ENTER
Software Version
Version: V1.06 *

2 UTILITY MENU:.....
<< Program Utilities >>

ENTER ⇓ ⇑ ESC

2.1 **PROGRAM UTILITY:**
<< Recall a Program >>
ESC ⇐ ⇒ ENTER
Recall a Program
01: Preset 01
: :
32: Preset 32

2.2 **PROGRAM UTILITY:**
<< Save a Program >>
ESC ⇐ ⇒ ENTER
Save a Program
01: Preset 01
: :
32: Preset 32

2.3 **PROGRAM UTILITY:**
<< Delete a Program >>
ESC ⇐ ⇒ ENTER
Delete a Program
01: Preset 01
: :
32: Preset 32

3 UTILITY MENU:.....
<< Memory Card Utilities >>

ENTER ⇓ ⇑ ESC

***3.0* If No Pc CARD is inserted in the Unit's front panel socket, the DPA48 will just display "Error: Card not inserted"**

***3.1* If a Pc CARD is inserted in the Unit's front panel socket, the following actions will be available:**

3.1.1 **PROGRAM UTILITY:**
<< Recall a Program >>
ESC ⇐ ⇒ ENTER
Recall a Program
01: Preset 01
: :
32: Preset 32

3.1.2 **PROGRAM UTILITY:**
<< Save a Program >>
ESC ⇐ ⇒ ENTER
Save a Program
01: Preset 01
: :
32: Preset 32

3.1.3 **PROGRAM UTILITY:**
<< Delete a Program >>
ESC ⇐ ⇒ ENTER
Delete a Program
01: Preset 01
: :
32: Preset 32

4 UTILITY MENU:.....
<< Interface Utilities >>

ENTER ⇓ ⇑ ESC

4.1 **INTERFACE UTILITY:**
Interface Setup
ESC ⇐ ⇒ ENTER
Interface Setup
Source: USB
Source: RS485
Source: TCP/IP *

4.1.2 **INTERFACE UTILITY:**
Source RS485
:
Source RS485
ESC ⇐ ⇒ ENTER
Interface Setup
Remote ID Num = 01 *
:
Remote ID Num = 32 *

4.1.3 **INTERFACE UTILITY:**
Source TCP/IP
:
Source TCP/IP
ESC ⇐ ⇒ ENTER
Interface Setup
IP ADDR = 192.168.0.101 *
:
IP ADDR = 192.168.0.132 *

4 UTILITY MENU:.....
<< Security Utilities >>

ENTER ⇓ ⇑ ESC

4.1 **SECURITY UTILITY:**
Show Parameter
ESC ⇐ ⇒ ENTER
Parameter will
be shown *
not be shown

4.2 **SECURITY UTILITY:**
Lock Unit
ESC ⇐ ⇒ ENTER
Lock Unit
Lock: Off *
Lock: On

4.3 **SECURITY UTILITY:**
User Password
ESC ⇐ ⇒ ENTER
User Password
[ ]

4.4 **SECURITY UTILITY:**
Enable Password
ESC ⇐ ⇒ ENTER
Enable Password
Password: Enable
Password: Disable *

(For the details about the Password Setting/Enable and Unit Lock, , refer to the "Utility Menus Use" Section)

MENU "Input A/B/C/D" Input Channels Editing [Access by pushing the "A/B/C/D" buttons]

NAV/PM1 Encoder
[to navigate between menus]

NAV/PM1 Enc.
[to chose values for the parameters, no need to confirm the chosen values, which are automatically loaded during the encoders use]

PM2 Enc.

PM3 Enc.

1. Input A/B/C/D N Gate
Noise Gate = Off

-> **Noise Gate = Off** | PM1 N/A | **Off**
On | **Same as PM2**

2. Input A/B/C/D Source
Source = Analog

-> **Source = Analog** | PM1 N/A | **Analog**
Digital
White noise
Pink Noise | **Same as PM2**

3. Input A/B/C/D Gain
Gain = + 0.0 dB

-> **Gain = + 0.0 dB** | PM1 N/A | **-18 db**
:
+18 dB | **Same as PM2**

4. Input A/B/C/D Delay
Delay = 0.000 ms

-> **Delay = 0.000 ms** | PM1 N/A | **000.0000mS**
[1 ms steps]
848.0000mS | **000.0000mS**
[20.8 us steps]
000.9984mS

5. Input A/B/C/D EQ Byp
EQ Bypass = Off

-> **EQ Bypass = Off** | PM1 N/A | **Off**
:
On | **Same as PM2**

6. Input A/B/C/D EQ-X (X from 1 to 5)
Byp = Off Type = Y (Y = Peaking_Eq, Hi-Shelv_1, Hi-Shelv_2, Hi-Shelv_Q, Lo-Shelv_1, Lo-Shelv_2, Lo-Shelv_Q, Lo-Pass_1, Lo-Pass_2, Lo-Pass_Q, Hi-Pass_1, Hi-Pass_2, Hi-Pass_Q, All Pass_1, All Pass_2, Band Pass, Notch Filt)

-> **Byp = Off Type = Y** | PM1 N/A | **Off**
:
On | **Peaking_Eq**
:
Notch Filt

Through the PM2, it is possible to Byp the single selected filter.
Through the PM3, it is possible to select one of the 17 available filters' type.
Once selected the filter Type and NOT in Byp mode, pressing again the ENTER button can be accessed the selected filter's editing page.

6.1 Input A/B/C/D EQ-[x] (X from 1 to 5)
-> **Byp = Off Type = Y**

6.1a. If selected a Peaking_Eq filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)
[Freq] [Gain] [Q]
-> **1000Hz +0.0dB Q=1.00** | *[Freq.]* **20Hz**
:
20kHz | *[Amp.]* **-15.0 dB**
:
+15.0 dB | *[Q]* **0.30**
:
20.00

6.1b. If selected a Hi-Shelv_1 (first order High Shelving) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)
[Freq] [Gain] [Q]
-> **1000Hz +0.0dB Q= ----** | *[Freq.]* **20Hz**
:
20kHz | *[Amp.]* **-15.0 dB**
:
+15.0 dB | *[Q]* **----**
:

6.1c. If selected a Hi-Shelv_2 (second order High Shelving) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)
[Freq] [Gain] [Q]
-> **1000Hz +0.0dB Q= ----** | *[Freq.]* **20Hz**
:
20kHz | *[Amp.]* **-15.0 dB**
:
+15.0 dB | *[Q]* **----**
:

6.1d. If selected a Hi-Shelv_Q (variable Q High Shelving) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)
[Freq] [Gain] [Q]
-> **1000Hz +0.0dB Q=1.00** | *[Freq.]* **20Hz**
:
20kHz | *[Amp.]* **-15.0 dB**
:
+15.0 dB | *[Q]* **0.30**
:
20.00

6.1e. If selected a Lo-Shelv_1 (first order Low Shelving) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz +0.0dB Q= ----	20Hz	-15.0 dB	----
	:	:	:
	20kHz	+15.0 dB	----

6.1f. If selected a Lo-Shelv_2 (second order Low Shelving) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz +0.0dB Q= ----	20Hz	-15.0 dB	----
	:	:	:
	20kHz	+15.0 dB	----

6.1g. If selected a Lo-Shelv_Q (variable Q Low Shelving) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz +0.0dB Q=1.00	20Hz	-15.0 dB	0.30
	:	:	:
	20kHz	+15.0 dB	20.00

6.1h. If selected a Lo-Pass_1 (first order Low Pass) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz -----dB Q= ----	20Hz	-----	----
	:	:	:
	20kHz	-----	----

6.1i. If selected a Lo-Pass_2 (second order Low Pass) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz ----- Q= ----	20Hz	-----	----
	:	:	:
	20kHz	-----	----

6.1l. If selected a Lo-Pass_Q (variable Q Low Pass) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz ----- Q=1.00	20Hz	-----	0.30
	:	:	:
	20kHz	-----	20.00

6.1m. If selected a Hi-Pass_1 (first order High Pass) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz -----dB Q= ----	20Hz	-----	----
	:	:	:
	20kHz	-----	---

6.1n. If selected a Hi-Pass_2 (second order High Pass) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz ----- Q= ----	20Hz	-----	----
	:	:	:
	20kHz	-----	----

6.1o. If selected a Hi-Pass_Q (variable Q High Pass) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz ----- Q=1.00	20Hz	-----	0.30
	:	:	:
	20kHz	-----	20.00

6.1p. If selected an All-Pass_1 (first order All Pass) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz -----dB Q= ----	20Hz	-----	----
	:	:	:
	20kHz	-----	----

6.1q. If selected an All-Pass_2 (second order, variable Q All Pass) filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz ----- Q=1.00	20Hz	-----	0.30
	:	:	:
	20kHz	-----	20.00

6.1r. If selected a Band Pass filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz +0.0dB Q=1.00	20Hz	-15.0 dB	0.30
	:	:	:
	20kHz	+15.0 dB	20.00

6.1s. If selected a Notch Filt filter, then the filter can be set by the following parameters
Input A/B/C/D EQ-[x] (up to 5 filters available)

	[Freq.]	[Amp.]	[Q]
-> 1000Hz -----dB Q=1.00	20Hz	-----	0.30
	:	:	:
	20kHz	-----	20.00

MENU "1/2/3/4/5/6/7/8 Output Channels Editing" [Access by pushing the "1/2/3/4/5/6/7/8" buttons]

NAV/PM1 Encoder
[to navigate between menus]

NAV/PM1 Enc. **PM2 Enc.** **PM3 Enc.**
[to chose values for the parameters, no need to confirm the chosen values, which are automatically loaded during the encoders use]

1. Output*[x]* *[Name]* HPF
YF = 20.0 Hz (Y = Bypass OR Filter Type/Order, where filter type can be Buttw_1st, Buttw_2nd, LRiley_2nd, Bessel_2nd, Buttw_3rd, Buttw_4th, Lriley_4th, Bessel_4th, Custom_2nd, Custom_3rd, Custom_4th)

-> **YF = 20.0 Hz**

Freq Fast Selection ONLY in Freq Editing Mode

[Filt Type] **Bypass : Custom_4th**

[Freq.] **20Hz : 20kHz**

Through the PM2, it is possible to Bypass the filter or to select one of the 11 available filters' type/orders, and through the PM3 to set the HP cutting Frequency (quick fine tuning by 1Hz steps). Once selected the filter Type and pressing again the ENTER button can be accessed the selected filter's Fast Freq.Selection page.

1.1 Output*[x]* *[Name]* HPF
-> **YF = 20.0 Hz**

1.1a. If selected a filter from Buttw_1st up to Bessel_4th, then the filter's Cutting Frequency can be set as follow:
Output*[x]* *[Name]* HPF
-> **Edit Freq = 250Hz**

[Thousands Editor]
[Freq.] **1000Hz : 20000Hz**

[Hundreds Editor]
[Freq.] **100Hz : 900Hz**

[Units Editor]
[Freq.] **1Hz : 100Hz**

1.1b. If selected a Custom Filter (from 2nd up to 4th order), depending from the filter's order, the cascade od second order Cells building the filter are available for editing in their Freq and Q parameter, indepndently.
For proceeding with the editing of a custom filter Cell, the PM1 is here used foir the Cell selection.
So, a Cutom Filter can be set in its parameters, as follow:

1.1b.1. If selected a Custom_2nd filter
Output*[x]* *[Name]* HPF
->Custom_2nd F = 250Hz

→ **Filtx F= 250Hz Q = 0.3**

[2nd order Cells selection]
[2nd Ord Cell x] **x=1 : x=1** *[Freq.]* **20Hz : 20kHz** *[Q]* **0.05 : 10.00**

1.1b.2. If selected a Custom_3rd filter
Output*[x]* *[Name]* HPF
->Custom_3rd F = 250Hz
→ **Filtx F= 250Hz Q = 0.3**

[2nd Ord Cell x] **x=1 :**
[Q not available] **x=2**

[Freq.] **20Hz : 20kHz**

[Q] **0.05 : 10.00**

1.1b.3. If selected a Custom_4th filter
Output*[x]* *[Name]* HPF
->Custom_4th F = 250Hz

→ **Filtx F= 250Hz Q = 0.3**

[2nd Ord Cell x] **x=1 : x=2**

[Freq.] **20Hz : 20kHz**

[Q] **0.05 : 10.00**

Once editing the Cells "Filtx", pressing the Enter Button can be accessed also for the Custom Filters the page for the fast frequency setting, as available for the NOT Custom Filters and which way of working is described at the point 1.1a.

2. Output*[x]* *[Name]* LPF
Y F = 20.0 Hz (Y = Bypass OR Filter Type/Order, where filter type can be Buttw_1st, Buttw_2nd, LRiley_2nd, Bessel_2nd, Buttw_3rd, Buttw_4th, Lriley_4th, Bessel_4th, Custom_2nd, Custom_3rd, Custom_4th)

-> **Y F =20.0 Hz**

Freq Fast Selection ONLY in Freq Editing Mode

[Filt Type] **Bypass : Custom_4th**

[Freq.] **20Hz : 20kHz**

Through the PM2, it is possible to Bypass the filter or to select one of the 11 available filters' type/orders, and through the PM3 to set the HP cutting Frequency (quick fine tuning by 1Hz steps). Once selected the filter Type and pressing again the ENTER button can be accessed the selected filter's Fast Freq.Selection page.

2.1 Output*[x]* *[Name]* LPF
-> YF = 20.0 Hz

2.1a. If selected a filter from Buttw_1st up to Bessel_4th, then the filter's Cutting Frequency can be set as follow:

Output*[x]* *[Name]* LPF | **[Thousands Editor]** | **[Hundreds Editor]** | **[Units Editor]**
-> Edit Freq = 250Hz | *[Freq.]* **1000Hz** | *[Freq.]* **100Hz** | *[Freq.]* **1Hz**
: | : | :
20000Hz | **900Hz** | **100Hz**

2.1b. If selected a Custom Filter (from 2nd up to 4th order), depending from the filter's order, the cascade od second order Cells building the filter are available for editing in their Freq and Q parameter, indepndently.
For proceeding with the editing of a custom filter Cell, the PM1 is here used foir the Cell selection.
So, a Cutom Filter can be set in its parameters, as follow:

2.1b.1. If selected a Custom_2nd filter

Output*[x]* *[Name]* LPF | **[2nd order Cells selection]**
->Custom_2nd F = 250Hz
→ Filtx F= 250Hz Q = 0.3 | *[2nd Ord Cell x]* **x=1** | *[Freq.]* **20Hz** | *[Q]* **0.05**
: | : | :
x=1 | **20kHz** | **10.00**

2.1b.2. If selected a Custom_3rd filter

Output*[x]* *[Name]* LPF
->Custom_3rd F = 250Hz
→ Filtx F= 250Hz Q = 0.3 | *[2nd Ord Cell x]* **x=1** | *[Freq.]* **20Hz** | *[Q]* **0.05**
: | : | :
[Q not available] **x=2** | **20kHz** | **10.00**

2.1b.3. If selected a Custom_4th filter

Output*[x]* *[Name]* LPF
->Custom_4th F = 250Hz
→ Filtx F= 250Hz Q = 0.3 | *[2nd Ord Cell x]* **x=1** | *[Freq.]* **20Hz** | *[Q]* **0.05**
: | : | :
x=2 | **20kHz** | **10.00**

Once editing the Cells "Filtx", pressing the Enter Button can be accessed also for the Custom Filters the page for the fast frequency setting, as available for the NOT Custom Filters and which way of working is described at the point 1.1a.

3. Out-[x] EQ-[x] (X from 1 to 7)
Byp = Off Type = Y (Y = Peaking_Eq, Hi-Shelv_1, Hi-Shelv_2, Hi-Shelv_Q, Lo-Shelv_1, Lo-Shelv_2, Lo-Shelv_Q, Lo-Pass_1, Lo-Pass_2, Lo-Pass_Q, Hi-Pass_1, Hi-Pass_2, Hi-Pass_Q, All Pass_1, All Pass_2, Band Pass, Notch Filt)

-> Byp = Off Type = Y | PM1 N/A | **Off** | **Peaking_Eq**
: | : | :
On | **Notch Filt**

Through the PM2, it is possible to Byp the single selected filter.
Through the PM3, it is possible to select one of the 17 available filters' type.
Once selected the filter Type and NOT in Byp mode, pressing again the ENTER button can be accessed the selected filter's editing page.

3.1 Out-[x] EQ-[x] (X from 1 to 7)
-> Byp = Off Type = Y

3.1a. If selected a Peaking_Eq filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)
[Freq] *[Gain]* *[Q]*
-> 1000Hz +0.0dB Q=1.00 | *[Freq.]* **20Hz** | *[Amp.]* **-15.0 dB** | *[Q]* **0.30**
: | : | :
20kHz | **+15.0 dB** | **20.00**

3.1b. If selected a Hi-Shelv_1 (first order High Shelving) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)
[Freq] *[Gain]* *[Q]*
-> 1000Hz +0.0dB Q= ---- | *[Freq.]* **20Hz** | *[Amp.]* **-15.0 dB** | *[Q]* **----**
: | : | :
20kHz | **+15.0 dB** | **----**

3.1c. If selected a Hi-Shelv_2 (second order High Shelving) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)
[Freq] *[Gain]* *[Q]*
-> 1000Hz +0.0dB Q= ---- | *[Freq.]* **20Hz** | *[Amp.]* **-15.0 dB** | *[Q]* **----**
: | : | :
20kHz | **+15.0 dB** | **----**

3.1d. If selected a Hi-Shelv_Q (variable Q High Shelving) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)
[Freq] *[Gain]* *[Q]*
-> 1000Hz +0.0dB Q=1.00 | *[Freq.]* **20Hz** | *[Amp.]* **-15.0 dB** | *[Q]* **0.30**
: | : | :
20kHz | **+15.0 dB** | **20.00**

3.1e. If selected a Lo-Shelv_1 (first order Low Shelving) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)
[Freq] *[Gain]* *[Q]*
-> 1000Hz +0.0dB Q= ---- | *[Freq.]* **20Hz** | *[Amp.]* **-15.0 dB** | *[Q]* **----**
: | : | :
20kHz | **+15.0 dB** | **----**

3.1f. If selected a Lo-Shelv_2 (second order Low Shelving) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz +0.0dB Q= ----**

[Freq.] **20Hz : 20kHz** *[Amp.]* **-15.0 dB : +15.0 dB** *[Q]* **---- : ----**

3.1g. If selected a Lo-Shelv_Q (variable Q Low Shelving) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz +0.0dB Q=1.00**

[Freq.] **20Hz : 20kHz** *[Amp.]* **-15.0 dB : +15.0 dB** *[Q]* **0.30 : 20.00**

3.1h. If selected a Lo-Pass_1 (first order Low Pass) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz -----dB Q= ----**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **---- : ----**

3.1i. If selected a Lo-Pass_2 (second order Low Pass) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz ----- Q= ----**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **---- : ----**

3.1l. If selected a Lo-Pass_Q (variable Q Low Pass) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz ----- Q=1.00**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **0.30 : 20.00**

3.1m. If selected a Hi-Pass_1 (first order High Pass) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz -----dB Q= ----**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **---- : ----**

3.1n. If selected a Hi-Pass_2 (second order High Pass) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz ----- Q= ----**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **---- : ----**

3.1o. If selected a Hi-Pass_Q (variable Q High Pass) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz ----- Q=1.00**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **0.30 : 20.00**

3.1p. If selected an All-Pass_1 (first order All Pass) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz -----dB Q= ----**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **---- : ----**

3.1q. If selected an All-Pass_2 (second order, variable Q All Pass) filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz ----- Q=1.00**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **0.30 : 20.00**

3.1r. If selected a Band Pass filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz +0.0dB Q=1.00**

[Freq.] **20Hz : 20kHz** *[Amp.]* **-15.0 dB : +15.0 dB** *[Q]* **0.30 : 20.00**

3.1s. If selected a Notch Filt filter, then the filter can be set by the following parameters

Out-[x] EQ-[x] (up to 7 filters available)

[Freq] [Gain] [Q]

-> **1000Hz ----- dB Q=1.00**

[Freq.] **20Hz : 20kHz** *[Amp.]* **----- : -----** *[Q]* **0.30 : 20.00**

4. Output *[x]* *[Name]* Vu-Meter
Vu-Meter = *Level*

-> **Vu-Meter = *Level***

PM1 N/A

Level
Limiter Act.
RMS Cmp Act.

Same as PM2

5. Output *[x]* *[Name]* Name
Name = *[Name]*

-> **Name = _**

(For Editing the Device's Name, refer to the Details on the "Utility Menus Use" Section)

6. Output *[x]* *[Name]* Source
A=00 B=--- C=--- D=---

-> **In-A**
-> **In-B**
-> **In-C**
-> **In-D**

Mute = On/Off Val= -30 up to 00
Mute = On/Off Val= -30 up to 00
Mute = On/Off Val= -30 up to 00
Mute = On/Off Val= -30 up to 00

7. Output *[x]* *[Name]* Gain
Gain = + 0.0 dB

-> **Gain = + 0.0 dB**

PM1 N/A

-18 db
:
+18 dB

Same as PM2

8. Output *[x]* *[Name]* *RMS Cmp*
Thr: +12.0dBu Rto: 1:1

-> **Thr: +12.0dBu Rto: 1:1**

PM1 N/A

[Threshold] **+20.0dBu**
:
-10.0dBu

[Ratio] **1:1**
:
32:1

9. Output *[x]* *[Name]* *RMS Cmp*
A: 5ms R: 0.2s Kn= 2%

-> **A: 5ms R: 0.2s Kn= 2%**

[Atk time] **5ms**
:
200ms

[Rel time] **0.1s**
:
3.0s

[Knee.] **Hard (00%)**
:
Soft (100%)

10. Output *[x]* *[Name]* Limiter
A: 5ms R: 0.2s +20dB

-> **A: 5ms R: 0.2s +20dB**

[Atk time] **5ms**
:
200ms

[Rel time] **0.1s**
:
3.0s

[Amp.] **-10.0 dB**
:
+20.0dB (OFF)

11. Output *[x]* *[Name]* Delay
Delay = 0.000 ms

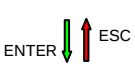
-> **Delay = 0.000 ms**

PM1 N/A

000.0000mS
(1 ms steps)
848.0000mS

000.0000mS
(20.8 us steps)
000.9984mS

12. Output *[x]* *[Name]* Polarity
Polarity = Normal



-> **Polarity = Normal**

PM1 N/A

Normal
Invert

Same as PM2

Menu "UTILITY" [access by pushing the "UTILITY" button]

From the "Default Screen", it is possible access the "UTILITY" menu pushing the "UTILITY" button and the Sub-Menus pages can be selected just rotating clockwise and counter-clockwise the "NAV/PM1" encoder.
Once selected the sub-menu page, using the "ENTER" button can be accessed the Sub-Menus pages, again "scrollable" using the "NAV/PM1" encoder and accessible for the parameters' editing pushing again the "ENTER' button.
Through the "ESC" button, it is any time possible to go back to the action and page preceding the "ENTER" button use.
Once inside the Sub-Menus pages, the several options can be scrolled and using the PM2 or PM3 encoders and selected/confirmed pushing the "ENTER" button.

Note: In every Sub-Menu the option currently selected/running will have an asterisk "*" showing to the right of the description on the LCD screen.

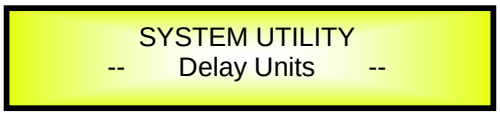
Options that are not selected/running will be displayed with NO Asterisk.

Pushing the ENTER button on an unselected option will mean an asterisk will then appear and this option will now take over as the currently selected/running option.

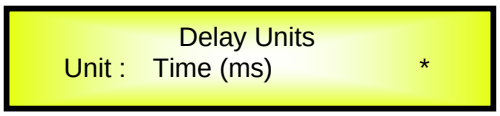
System Utilities Sub-menu – this sub-menu allows to access several operations related to the DPA480 Start Up and General Configuration:

From the "System Utilities Sub-menu", pushing "ENTER" and then using the "NAV/PM1" encoder for scrolling will give access to the following pages:

- **Delay Time/Distance:** this page allows you to select the measurement unit to be used for the Delays: Time (in milliseconds "ms") or Distance (in meters "m"):



  By pressing ENTER and rotating the "PM2" or "PM3" encoder, it is possible to select the measurement unit to be used for the delay, which will be confirmed by pushing the ENTER button.
  The following screen shows the selected delay measurement is Time (milliseconds)



- **Software Version:** this page allows you to confirm the Software Version running on the DPA480:

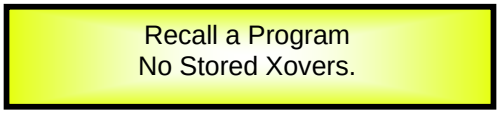
  The correct Software Version is "V1.06"

Program Utilities Sub-menu – this sub-menu allows you to access several options related to the DPA480 operating mode and to manage the presets stored and recallable within the Unit:

By pressing the ENTER button and then using the "NAV/PM1" encoder the following pages can be accessed:

- **Recall a Program:** this page allows the Loading of a preset program. You can store up to 32 presets in the DPA480 memory:

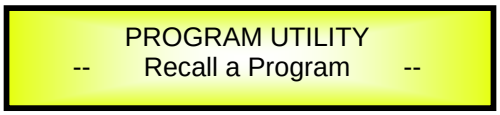
By pressing ENTER and rotating the "PM2" or "PM3" encoders, it is possible to scroll through all current available user presets.
If NO USER PRESETS are stored yet, the screen will show the following:



If presets have previously been stored by the user, anyone of them can be recalled:

By using the "PM2" or "PM3" encoder it is possible to scroll through the stored presets. Once the desired preset appears on the screen select it by pressing the "ENTER" button and this will force the DPA480 to begin to load this selected preset and the following transitory screen will appear:

Once loaded the DPA480 will exit to the "Recall a Program" screen automatically and the above screen will disappear:

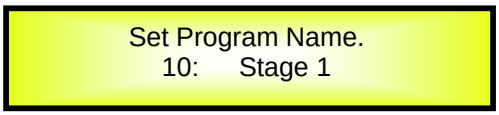


Note: at any time it is possible to quit the recall action by pressing the "ESC" button.

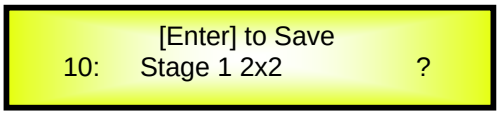
- **Save a Program:** this page allows you to store a new preset in the DPA480's memory:

By pressing the ENTER button and rotating the "PM2" or "PM3" encoder, it is possible to scroll through the previously saved presets and the available empty locations (identified by "Empty Memory").
If no user presets are stored, the "Save a Program" screen will show empty memory locations for all 1-32 presets as shown in the example below for location 10:

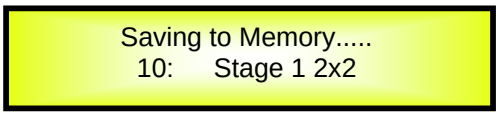
When storing an edited configuration for the DPA480, select the location for a preset from the 32 available by using the "PM2" or "PM3" encoders.
Once the desired location appears on the screen press ENTER again to reach the "Set Program Name" page.
In this page the User can enter a Preset Name (up to 16 Characters) by using the "PM2" or "PM3" encoder to choose a character and the "NAV/PM1" encoder to move between the 16 available locations for the character's positioning.
The current position of the cursor is shown by a "blinking underscore".
The following is an example of a screen while entering the preset name "Stage 1 2x2" in location 10:



To store the Preset Name press the "ENTER" button again.
The above action will take you to the "Enter to Save" page showing the selected location for the preset and the final edited name:



Pressing "ENTER" again, will store the preset in the selected location with the chosen name and the following transitory screen will appear on the LCD:



Once the preset is stored, the above screen will disappear returning to the following screen:

If during the Preset Storing process you want to overwrite an existing memory location select this location in the "Save a Program" page, then ENTER and you will be asked if you want to overwrite this preset with the following "[ENTER] to Overwrite" screen displaying the currently stored preset and location:

If you wish to proceed press "ENTER" again and the DPA480 will go ahead with the "Set Program Name" page and the subsequent overwrite on completion of the previously described storing process..

Note: at any time it is possible to quit the storing action by pressing the "ESC" button.

– **Delete a Program:** this page allows you to delete a preset already stored in the DPA480 memory:

By pressing the ENTER button and rotating the "PM2" or "PM3" encoder, it is possible to scroll through the previously saved presets and the available empty locations (identified by "Empty Memory").
If no user presets are stored, the "Delete a Program" screen will show empty memory locations for all 1-32 presets as shown in the example below for location 10:

If Presets are available they will be shown in the "Delete a Program" page as follows:

By using the "PM2" or "PM3" encoder it is possible to select a preset to be deleted.

Pressing the "ENTER" button on a selected preset will bring up the "[Enter] to Delete." page showing the selected preset.

For example, if we want to delete the preset 10, "Stage 1 2x2", the screen will be the following:

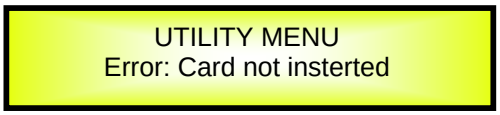
Confirming the deletion by pressing "ENTER" again, will force the DPA480 to erase the selected preset and the following transitory screen will appear:

Once the preset is deleted, the above screen will disappear returning to the following screen:

Note: At any time it is possible to quit the deleting action by pressing the "ESC" button.

Memory Card Utilities Sub-menu – this sub-menu allows you to access several options related to the DPA480 operating mode and to manage the presets stored and recallable within the PC Card when inserted in the front panel related Socket:

If NO CARD INSERTED in the Socket, then the unit, if trying to access the Sub Menu pressing the Enter button, will show the following



If a CARD IS INSERTED in the Socket and properly formatted, then it is possible to access the same menu' of options available for the recall, store and delete program, already dewscribed in the previous section.
If a Card is insterted in the socket, but not yet properly formatted, the Unit will ask the user to format the card, as soon as the user will attempt to access one of the Sub menu described in the previous section.
In a such case, the Display will show the following:

By pressing the ENTER button and then the PC Card will be properly formatted.

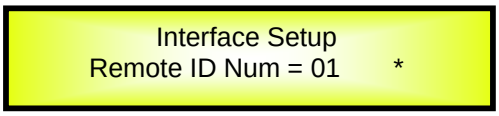
Interface Utilities Sub-menu – this sub-menu allows you to define the remote control interface (USB, RS485 or TCP/IP) to be used for controlling the DPA480 :

.
From "Interface Utilities", press "ENTER" to access the Interface Setup.

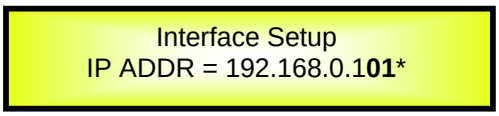
– **Interface Setup:** this screen allows you to choose the remote control protocol for the DPA480.

By pressing "ENTER" and then using the PM2 or PM3 encoders you can choose between the three possible interfaces (USB, RS4854 or TCP/IP) for the DPA480.
Pressing ENTER on a selected source will make an asterisk appear to the right of the description on the LCD as in the following example which shows the selected interface as USB.

If selected the RS485 option, using the encoders PM2/PM3 and pressing "Enter", the possibility of setting the ID Number characterising the Unit during a Multi Units connection through RS485, is given turning the PM1 counter clockwise and adjusting the ID Num to assign to the Unit, from 01 up to 32.



If selected the TCP/IP option, using the encoders PM2/PM3 and pressing "Enter", the possibility of setting the TCP/IP address for the unit is given turning the PM1 counter clockwise and adjusting the TCP/IP's first 2 digits from 01 up to 32.



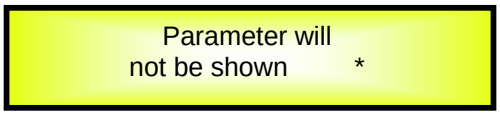
Security Sub-menu – this sub-menu allows the User to set the parameters shown, lock the DPA480 and set a Password therefore limiting the unit's functions and controls to those who have access to the appropriate Password.

Press ENTER and then use the NAV/PM1 to scroll between options.

– **Show Parameter:** Pressing ENTER from the above menu will access the "Show Parameter" Sub Menu

Press ENTER again and use the PM2 or PM3 encoders to scroll between the "be shown" and "not be shown" options. An asterisk will highlight which option is selected.
Choosing the "be shown" option means that once the unit is locked, you cannot access parameter editing features, but they will be displayed on the LCD screen.

Choosing the "not be shown" option means that once the unit is locked, the parameters will not be shown at all. With this option, when trying to access a parameter, the following screen message will appear:



– **Lock Unit:** this sub-menu allows the user to lock the device so no parameters can be edited or modified.

When the Unit is in an unlocked condition, all parameters will be available for editing. When you select On, all parameters will be locked and are not available for editing.

When you select lock from the menu, the unit will be locked and the lock menu automatically exited. The screen will revert to the "Default" showing the current XOVER configuration and the preset selected and beside the preset's name a "keylock" icon indicating that the DPA480 is locked.

– **User Password:** from the "User Password" sub-menu:

Press "ENTER" to access the "User Password" page:

Using the PM2 or PM3 encoders to choose a character and the NAV/PM1" encoder to move between available locations you can enter a 6 Character Password Name.
The current position of the cursor for the characters to be entered is shown by a "blinking underscore".
During this editing phase, the display is as follows if we were using "DPA48X" as the password:

The DPA480 will exit the "Unit Lock" sub-menu and jump to the "User Password" sub-menu page screen:

If the password entered in the "Confirm Password" page matches the one entered in the "Enter Password" page, the following screen will appear.

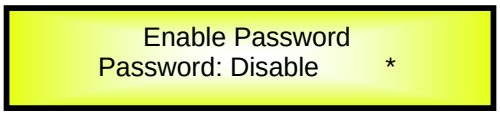
The Password is now configured and held in the device's memory.

The user can now decide to "lock" the DPA480 by Password, inhibiting the access to ALL processor functions depending on the setting of the parameter "Password Enable/Disable, explained in the following paragraph

Note: originally the DPA480 is initialized with a default Password which value is "000000", value that can be anytime reset with a "Factory Reset" (see "Factory Reset" procedure)

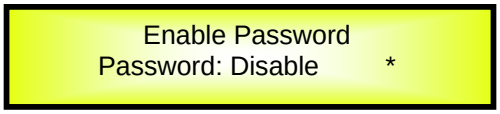
– **Enable Password:** from the "Enable Password" sub-menu:

Press "ENTER" to gain access to the "Enable Password" screen:



Once a Password has been entered into the DPA480 through the steps described in the previous paragraph, it is possible to "Enable" or "Disable" the password function and therefore lock the DPA480 restricting access to all functions.
When a password has been entered you will be able to select the "Enable" option from the menu and the unit will not be accessible for editing. In "Locked by Password Status", all DPA480 functions are inhibited to the User, including the use of the Mute A/B/C/D and MUTE 1/2/3/4/5/6/7/8 buttons.
The only access available is to the parameters of the input/output channels (accessible by pressing the edit button), ONLY to READ the values (no editing possible) if the "be shown" flag in the "Show Parameter" Sub-Menu has been selected.
Once "Locked by Password" the "keylock" icon will appear on the default LCD screen and no menu pages will be accessible, with the exception of the "User Password" option.
To regain access to the full operation of the DPA480 ENTER to the "User Password" screen and press the UTILITY Button to access the following screen to enable the correct password to be entered:

After the correct password has been entered, you will be able to access the full functionality of the DPA480, the "lock Icon" will disappear from the "Default Screen" and automatically the "Enable Password" page will be back to the "Disable" condition:



If no Password has been set within the DPA480, as described in the previous paragraphs, the DPA480 will not allow you to enable any Password, and the choice in the "Enable Password" will be limited to only the "Disable" option.

Menu "Input A/B/C/D" Input Channels Editing [access by pushing the "A/B/C/D" buttons]

From the "Default Screen", it is possible to access the "Input A/B/C/D" menu by pushing the "A", "B", "C" or "D" button. Once the button is pressed the related blue "EDIT" LED will turn ON. The Sub-Menu pages can now be scrolled through by rotating clockwise and counter-clockwise the "NAV/PM1" encoder.
For parameter editing it is necessary to press ENTER and an arrow will appear on the left of the screen "**->**". Then use the "PM2" and "PM3" encoders for selecting and setting the parameter values. On some parameters that have three independent values, you will also need to use the NAV/PM1 encoder, eg filter parameter settings.

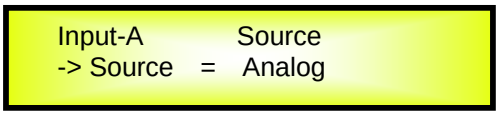
Note: All parameter editing can be done using the "NAV/PM1", "PM2", and "PM3" encoders and the current shown value of the selected option is AUTOMATICALLY loaded during the encoders' use and stored as the current value once leaving the page is AUTOMATICALLY loaded during the encoders' use and stored as current value once left the page.

Note1: once the desired options have been selected using the 3 encoders, they are automatically saved as current and stored in the DPA480 system status once leaving the page.
Note2: to exit this page, push the "ESC" button.

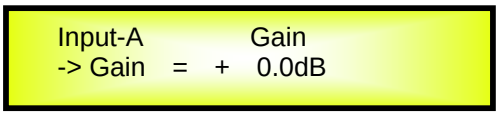
Audio Signal Input (A/B/C/D)

Noise Gate page – from this screen it is possible to turn On or Off the Noise Gate on the input path.
The full setting of the Noise Gate parameter can be done by Remote Control ONLY, through the Pc Sw coming with the Unit.

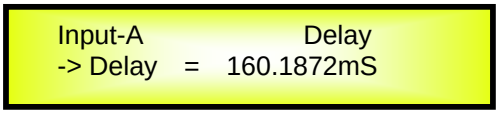
Source page – The Dpa480 can assign to each input channel, independently, the input source.
Particularly 4 sources for the Input are available: Analog (coming on the Input XLR connectors), Digital (coming on the S/Pdif RCA cpnnectors), White Noise or Pink Noise (generated internally).
The Input source can be selected pressing ENTER and using the "PM2" or "PM3" encoders.
The following is an example screen for the "Source" page that has set the Input as ANALOG:



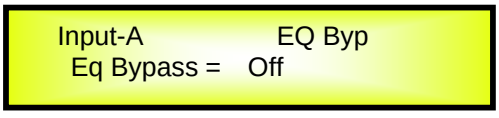
Gain page – from this screen it is possible to set the Input Channels Level from -18dB to +18dB, press ENTER an arrow will appear on the left of the screen "->" then use the "PM2" or "PM3" buttons.
The value set on this screen will only affect the input level of the selected Channel A, B,C or D.
The following is an example screen for the "Gain" page that has set the Gain of Input Channel A to +0.0dB:



Delay page – from this page it is possible to set the Input Channels Delay Time from 000.0000mS up to 848.9984mS, by steps of 1mS or 20.8uS.
To set the Delay time press ENTER, an arrow will appear on the left of the screen "**->**". then use the "PM2" encoder to set the Delay Time in steps of 1mS and the "PM3" for setting the "fine" Delay Time in steps of 20.8 microseconds.
The following is an example screen for the "Delay" page where the Delay Time of Input Channel A is set to 160.1872mS:



EQ Byp page – from this sub-menu it is possible to Bypass or to make active the 5 Bands Equalizer placed on the Input Signal Path.

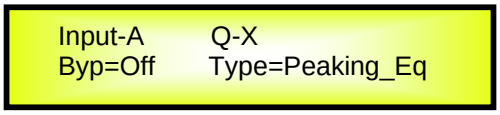


When Bypassed the 5 Bands Equalizer, its current setting will not be lost.

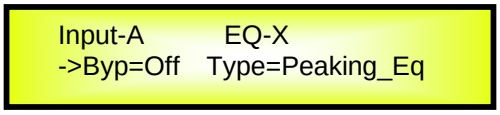
EQ: [x] sub-menu – from this sub-menu it is possible to set the Input Channels five available Multi-Type Filters. Anyone of the 5 filters of the Eq can be selected choosing from the following list of filter types:

1. **Peaking_Eq**: Peaking (Bell) filters, adjustable as Center Frequency, Gain and Q
   The DPA480 Peaking filters are at constant Q, so with Q not depending from the selected Gain value.
2. **Hi-Shelv_1**: High Shelving filters of the 1st order.
   These Shelving filter present 3dB less than the selected Gain, or 3dB more than the selected Attenuation, at the selected cutting frequency, and a slope of 6dB/Oct.
3. **Hi-Shelv_2**: High Shelving filters of the 2nd order.
   These Shelving filters present 3dB less than the selected Gain, or 3dB more than the selected Attenuation, at the selected cutting frequency, and a slope of 12dB/Oct.
4. **Hi-Shelv_Q**: Symmetrical High Shelving filters with Variable Q.
   These Shelving filters present ½ level of the selected Gain/Attenuation at the selected cutting frequency, and a slope that is depending from the chosen Q value.
5. **Lo-Shelv_1**: Low Shelving filters of the 1st order.
   These Shelving filters present 3dB less than the selected Gain, or 3dB more than the selected Attenuation, at the selected cutting frequency, and a slope of 6dB/Oct.
6. **Lo-Shelv_2**: Low Shelving filter of the 2nd order.
   These Shelving filters present 3dB less than the selected Gain, or 3dB more than the selected Attenuation, at the selected cutting frequency, and a slope of 12dB/Oct.
7. **Lo-Shelv_Q**: Symmetrical Low Shelving filters with Variable Q.
   These Shelving filters present ½ level of the selected Gain/Attenuation at the selected cutting frequency, and a slope that is depending from the chosen Q value.
8. **Low Pass_1**: Low Pass filters of the 1st order, with -3dB attenuation at the cutting frequency and a slope of 6dB/Oct.
9. **Low Pass_2**: Low Pass filters of the 2nd order, with -3dB attenuation at the cutting frequency and a slope of 12dB/Oct.
10. **Low Pass_Q**: Low Pass filters with Variable Q.
11. **High Pass_1**: High Pass filters of the 1st order, with -3dB attenuation at the cutting frequency and a slope of 6dB/Oct.
12. **High Pass_2**: High Pass filters of the 2nd order, with -3dB attenuation at the cutting frequency and a slope of 12dB/Oct.
13. **High Pass_Q**: High Pass filters with Variable Q.
14. **All Pass_1**: Filters allowing a FLAT Amplitude response and adding a 90 Degree Phase rotation at the selected Frequency.
15. **All Pass_2**: Filters allowing a FLAT Amplitude response and adding a 180 Degree Phase rotation at the selected Frequency.
16. **Band Pass**: Filters allowing to pass the band "around" the selected frequency.
    The amount of passing band is decided by the Q value
17. **Notch Filt**: Filters canceling the band "around" the selected frequency.
    The amount of canceled band is decided by the Q value

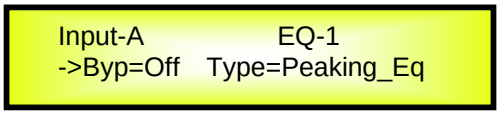
More, the DPA480 Is giving the possibility to "Bypass" any single filter of the 5 available in the Equalizer section; Once in the editing page of the single filter, a "Byp" field is available for making the single filter active or not



Pushing the Enter Button, the above window will allow the access to the "Byp" and "Type" fields.



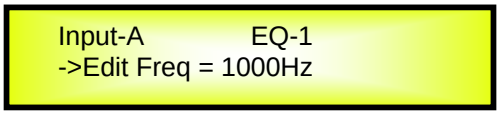
Using the PM2 encoder, the selected Filter can be activated or bypassed.
The DPA480 allows the user to select anyone of the filter's type listed above and assign them independently using the 5 available filters.In order to select the filter's type, it is necessary to use the PM3 encoder, rotate it "clockwise" or "counter-clockwise" to select the desired filter.So, in order to define the filter type for the filter number 1 ("x"=1), it is necessary from the above screen, to select the filter, which name will appear on the screen. If selected a Peaking_Eq filter, then the display will be as follow:



Once selected the desired Filter Type, its parameters can be accessed for editing just pressing again the ENTER Button.
Once pressed the ENTER Button, the editing page of the selected filter type will be accessed ONLY if the selected filter it is not set in Bypass mode.
Depending from the selected filter, the related parameters will be available for editing

Peaking_Eq Filter: Peaking filters are at constant Q, so with Q not depending from the selected Gain value
If we selected a Peaking_Eq filter within EQ-1, then the Q has to be set at a desired value of say 1.00 using the PM3 encoder, the GAIN at say +3dB using the PM2 encoder and the center Frequency at say 1.00KHz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

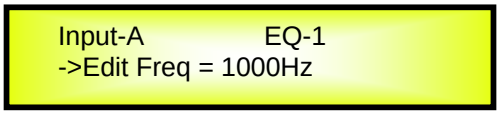
Once in the Peaking_Eq Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Filter's Center Frequency, Gain and Q:
"***Center Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable Gain range is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

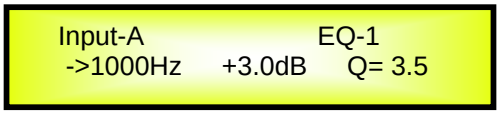
Hi_Shelv_1/2 Filter: These Shelving filters present 3dB less than the selected Gain, or 3dB more than the selected Attenuation, at the selected cutting frequency, and a slope of 6dB/Oct-12dB/Oct.
If we selected a High Shelving filter of the 1st/2nd order within EQ-1, then the GAIN has to be set at a desired value of say +3dB using the PM2 encoder and the Lo Cut Frequency at say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

Once in the Hi-Shelv_1/2 Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM2" encoders for editing the Filter's Low Cut Frequency and Gain:
"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable range of the Gain is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

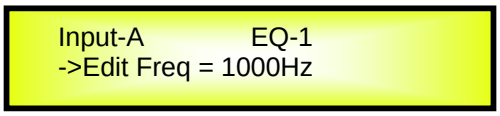


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Hi_Shelv_Q Filter: These Symmetrical Shelving filters present ½ level of the selected Gain/Attenuation at the selected cutting frequency, and a slope that is depending from the chosen Q value.
If we selected a High Shelving filter with variable Q within EQ-1, then the GAIN has to be set at a desired value of say +3dB using the PM2 encoder, the Q at 3.5 and the Lo Cut Frequency at say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

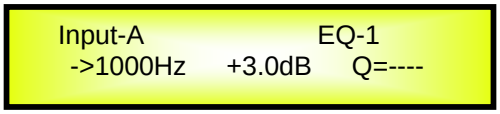


Once in the Hi-Shelv_Q Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Filter's Low Cut Frequency, Gain and Q:
"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable range of the Gain is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

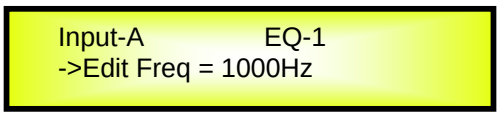


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

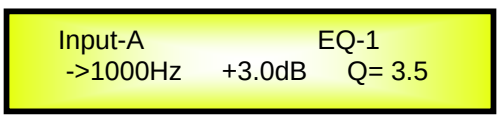
Lo_Shelv_1/2 Filter: These Shelving filters present 3dB less than the selected Gain, or 3dB more than the selected Attenuation, at the selected cutting frequency, and a slope of 6dB/Oct-12dB/Oct.
If we selected a Low Shelving filter of the 1st/2nd order within EQ-1, then the GAIN has to be set at a desired value of say +3dB using the PM2 encoder and the High Cut Frequency at say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:



Once in the Lo-Shelv_1/2 Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM2" encoders for editing the Filter's High Cut Frequency and Gain:
"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable range of the Gain is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

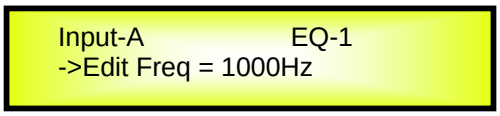


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.
Lo_Shelv_Q Filter: These Symmetrical Shelving filters present ½ level of the selected Gain/Attenuation at the selected cutting frequency, and a slope depending from the chosen Q value.
If we selected a Low Shelving filter with variable Q within EQ-1, then the GAIN has to be set at a desired value of say +3dB using the PM2 encoder, the Q at 3.5 using the PM3 and the Hi Cut Frequency at say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:



Once in the Lo-Shelv_Q Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Filter's High Cut Frequency, Gain and Q:
"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable range of the Gain is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.

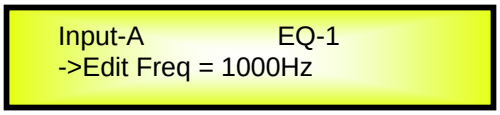
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Low Pass_1/2 Filter: These Low Pass filters present -3dB at the selected cutting frequency, and a slope of 6dB/Oct-12dB/Oct.
If we selected a Low Pass filter of the 1st/2nd order within EQ-1, then High Cut Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

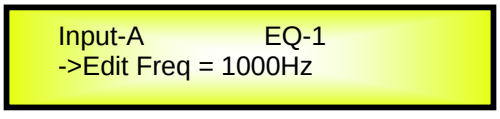
Once in the Low Pass_1/2 Filter's edit screen, the "NAV/PM1" encoder can be used for editing/modifying the Filter's High Cut Frequency:
"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

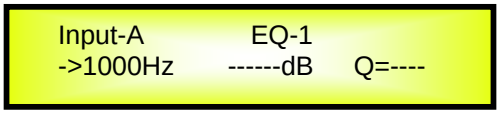
Low Pass_Q Filter: The Gain of these Low Pass filters can be modified at their cutting frequency corner depending from the value assigned to the Q parameter.
If we selected a Low Pass filter with variable Q within EQ-1, then High Cut Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder and the Q at 3.5 using the PM3 encoder; the EQ sub-menu screen will show the following:

Once in the Low Pass_Q Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM3" encoders for editing the Filter's High Cut Frequency and Q:
"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

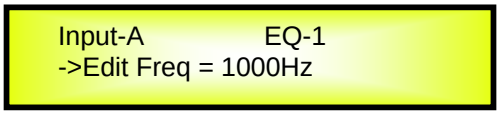


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

High Pass_1/2 Filter: These High Pass filters present -3dB at the selected cutting frequency, and a slope of 6dB/Oct-12dB/Oct.
If we selected a High Pass filter of the 1st/2nd order within EQ-1, then Low Cut Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

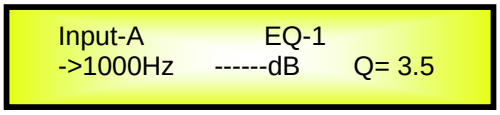


Once in the High Pass_1/2 Filter's edit screen, the "NAV/PM1" encoder can be used for editing/modifying the Filter's Low Cut Frequency:
"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

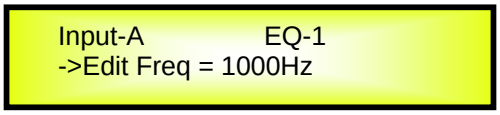


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

High Pass_Q Filter: The Gain of these High Pass filters can be modified at their cutting frequency corner depending from the value assigned to the Q parameter.
If we selected a High Pass filter with variable Q within EQ-1, then Low Cut Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder and the Q at 3.5 using the PM3 encoder; the EQ sub-menu screen will show the following:

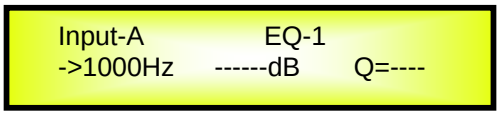


Once in the High Pass_Q Filter's edit screen all the filter's parameters can be modified using the "NAV/PM1" and "PM3" encoders for editing the Filter's Low Cut Frequency and Q:
"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

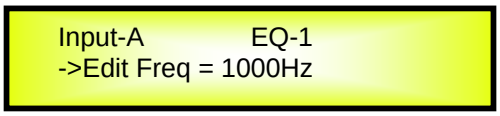


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

All Pass_1 Filter: Filters allowing a FLAT Amplitude response and adding a 90 Degree Phase rotation at the selected Frequency.
If we selected a All Pass filter of the 1st order within EQ-1, then Phase Rotation Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:



Once in the All Pass_1 Filter's edit screen, the "NAV/PM1" encoder can be used for editing/modifying the Filter's Phase Rotation Frequency:
"***Phase Rotation Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

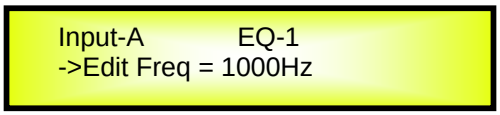


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

All Pass_2 Filter: Filters allowing a FLAT Amplitude response and adding a 180 Degree Phase rotation at the selected Frequency.

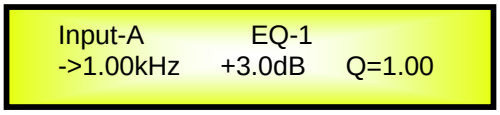
If we selected a All Pass_2 filter, with variable Q, within EQ-1, then Phase Rotation Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder and the Q at 3.5 using the PM3 encoder; the EQ sub-menu screen will show the following:

Once in the All Pass_2 Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM3" encoders for editing the Filter's Phase Rotation Frequency and Q:
"***Phase Rotation Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



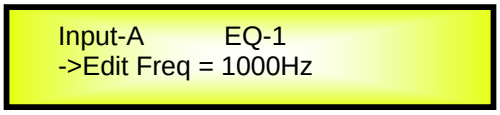
Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Band Pass Filter: Filters allowing to pass the band "around" the selected frequency; the amount of passing band is decided by the Q value
If we selected a Band Pass filter within EQ-1, then the Q has to be set at a desired value of say 1.00 using the PM3 encoder, the GAIN at say +3dB using the PM2 encoder and the center Frequency at say 1.00KHz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:



Once in the Band Pass Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Filter's Center Frequency, Gain and Q:

"***Center Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable Gain range is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

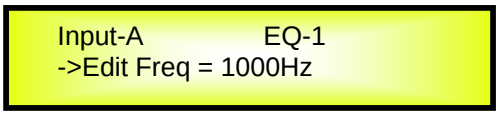


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Notch Filt Filter: Filters canceling the band "around" the selected frequency; the amount of canceled band is decided by the Q value
If we selected a Notch Filt filter within EQ-1, then the Q has to be set at a desired value of say 1.00 using the PM3 encoder and the Notch Frequency at say 1.00KHz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

Once in the Notch Filt Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM3" encoders for editing the Filter's Notch Frequency and Q:

"***Notch Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

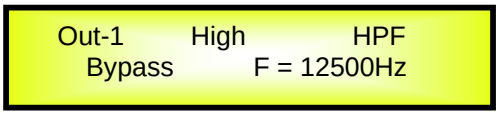
Menu "Output 1/2/3/4/5/6/7/8" Output Channels Editing [access by pushing the "1/2/3/4/5/6/7/8" buttons]

From the "Default Screen", it is possible to access the "Output Channel" menu by pressing the "1", "2", "3", "4", "5", "6", "7" or "8" button. Once pressed, the related blue "EDIT" LED will turn ON.
The Sub-Menus pages can now be scrolled through by rotating clockwise and counter-clockwise the "NAV/PM1" encoder.
For parameter editing it is necessary to press ENTER and an arrow will appear on the left of the screen "**->**". Then use the "PM2" and "PM3" encoders for selecting and setting the parameter values. On some parameters that have three independent values, you will also need to use the NAV/PM1 encoder, for example for the filter's parameter setting.

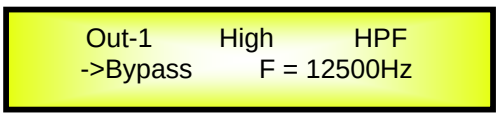
Note: All parameter editing can be done using the "NAV/PM1", "PM2", and "PM3" encoders and the current shown value of the selected option is AUTOMATICALLY loaded during the encoders' use and stored as the current value once leaving the page.

Audio Signal Output (1/2/3/4/5/6/7/8) Path Block Scheme

HPF sub-menu – from this sub-menu it is possible to set the Output Channels High Pass Filter.
Once on the HPF page



Pressing the ENTER Button, the filter type fields and the Cutting frequency fields, become accessible for the filter's type selection and the Cutting Frequency "fine" setting

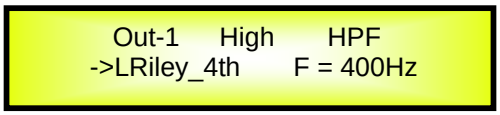


The available shapes and orders for the High Pass Filter, that are accessible by rotating the "PM2" encoder, are listed below:

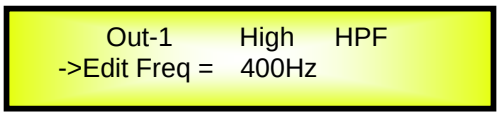
- **Bypass** (High Pass Filter Bypassed)
- **Buttw_1st** (Butterworth Filter 6dB/Oct Slope)
- **Buttw_2nd** (Butterworth Filter 12dB/Oct Slope)
- **LRiley_2nd** (Linkwitz/Riley Filter 12dB/Oct Slope)
- **Bessel_2nd** (Bessel Filter 12dB/Oct Slope)
- **Buttw_3rd** (Butterworth Filter 18dB/Oct Slope)
- **Buttw_4th** (Butterworth Filter 24dB/Oct Slope)
- **LRiley_4th** (Linkwitz/Riley Filter 24dB/Oct Slope)
- **Bessel_4th** (Bessel Filter 24dB/Oct Slope)
- **Custom_2nd** (IInd Order Filter Cell with editable Cutting Frequency and Q)
- **Custom_3rd** (Cascade of 2 IInd Order Filter Cells with editable Cutting Frequency on both and Q on the second one)
- **Custom_4th** (Cascade of 2 IInd Order Filter Cells with editable Cutting Frequency and Q on both of them)

HPF sub-menu [Standard Filters]– from the sub-menu page, using the PM2 encoder, it is possible to set the HPF in Bypass or as one of the 8 Standard Filters: Buttw_1st, Buttw_2nd, LRiley_2nd, Bessel_2nd, Buttw_3rd, Buttw_4th, LRiley_4th, Bessel_4th.

The following is an example of a HPF sub-menu screen with the filter set at 400Hz as 24dB Linkwitz/Riley on Output1… using the name "High" (see later for assigning a Name to the outputs):



The filter's Frequency can be set already within this editing page using the PM3 encoder, but here is for Frequency "fine tuning" being the Frequency increment/decrement done by 1Hz steps.
For a quick Low Cut Frequency setting, need to press the ENTER Button for accessing the Low Cut Frequency Fast Setting Page.

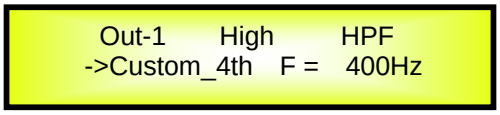


"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz.
Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

HPF sub-menu [Custom Filters]– from the sub-menu page, using the PM2 encoder, it is also possible to set the HPF as "Custom Filter", where this means that the HPF is builded as cascade of IInd Order Cells, which number is depending from the filter's order and where for each Cell can be set independently the Low Cut frequency and the Q. More precisely, the available independent parameters for setting are the following:

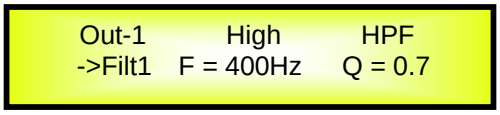
1. Customm_2nd: builded using 1 IInd order Cell, where Low Cut Frequency and Q can be set
2. Customm_3rd: builded using 2 IInd order Cell, where Low Cut Frequency can be set on both the cascaded Cells and the Q on the second one
3. Customm_4th: builded using 2 IInd order Cell, where Low Cut Frequency and the Q be set on both the cascaded Cells.

The following is an example of a HPF sub-menu screen with the filter set at 400Hz as Custom_4th on Output1… using the name "High" (see later for assigning a Name to the outputs):

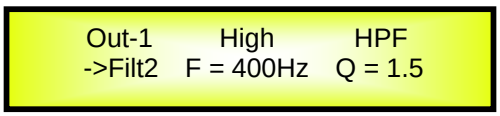


From this Page, to access the cascaded IInd order Cells, it is necessary to rotate the NAV/PM1 encoder Clockwise or Counterclockwise.
The number of accessible IInd order Cells is depending from the Custom Filter order: Custom_2nd will allow the editing of just one IInd order Cell, Custom_3rd and Custom_4th, the access to 2 IInd order Cells.

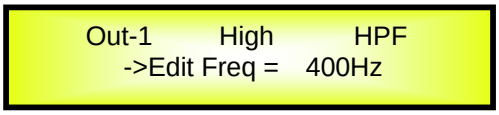
In the previous example, rotating Clockwise the NAV/PM1 encoder, we can access the Filt1 (Cell1) and Filt2 (Cell2) pages, for the Cells Low Cut Frequency and Q settings.
When within the Filt1 editing Page, in example:



And we can chose a different setting within the Filt2 page:

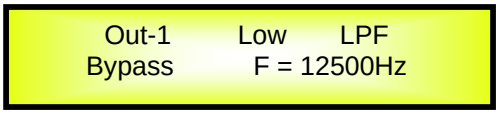


The filter's Frequency can be set already within these editing pages using the PM2 encoder, but here is for Frequency "fine tuning" being the Frequency increment/decrement done by 1Hz steps.
For a quick Low Cut Frequency setting, need to press the ENTER Button for accessing the Low Cut Frequency Fast Setting Page.

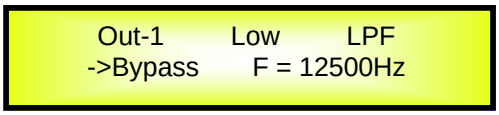


"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz.
Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

LPF sub-menu – from this sub-menu it is possible to set the Output Channels Low Pass Filter.
Once on the LPF page



Pressing the ENTER Button, the filter type fields and the Cutting frequency fields, become accessible for the filter's type selection and the Cutting Frequency "fine" setting

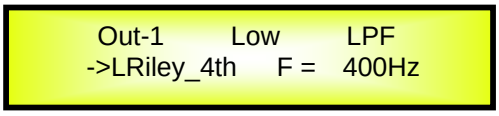


The available shapes and orders for the Low Pass Filter, that are accessible by rotating the "PM2" encoder, are listed below:

- **Bypass** (Low Pass Filter Bypassed)
- **Buttw_1st** (Butterworth Filter 6dB/Oct Slope)
- **Buttw_2nd** (Butterworth Filter 12dB/Oct Slope)
- **LRiley_2nd** (Linkwitz/Riley Filter 12dB/Oct Slope)
- **Bessel_2nd** (Bessel Filter 12dB/Oct Slope)
- **Buttw_3rd** (Butterworth Filter 18dB/Oct Slope)
- **Buttw_4th** (Butterworth Filter 24dB/Oct Slope)
- **LRiley_4th** (Linkwitz/Riley Filter 24dB/Oct Slope)
- **Bessel_4th** (Bessel Filter 24dB/Oct Slope)
- **Custom_2nd** (IInd Order Filter Cell with editable Cutting Frequency and Q)
- **Custom_3rd** (Cascade of 2 IInd Order Filter Cells with editable Cutting Frequency on both and Q on the second one)
- **Custom_4th** (Cascade of 2 IInd Order Filter Cells with editable Cutting Frequency and Q on both of them)

LPF sub-menu [Standard Filters]– from the sub-menu page, using the PM2 encoder, it is possible to set the LPF in Bypass or as one of the 8 Standard Filters: Buttw_1st, Buttw_2nd, LRiley_2nd, Bessel_2nd, Buttw_3rd, Buttw_4th, LRiley_4th, Bessel_4th.

The following is an example of a LPF sub-menu screen with the filter set at 400Hz as 24dB Linkwitz/Riley on Output1… using the name "Low" (see later for assigning a Name to the outputs):



The filter's Frequency can be set already within this editing page using the PM3 encoder, but here is for Frequency "fine tuning" being the Frequency increment/decrement done by 1Hz steps.
For a quick High Cut Frequency setting, need to press the ENTER Button for accessing the High Cut Frequency Fast Setting Page.

"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz.
Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

LPF sub-menu [Custom Filters]– from the sub-menu page, using the PM2 encoder, it is also possible to set the LPF as "Custom Filter", where this means that the LPF is builded as cascade of IInd Order Cells, which number is depending from the filter's order and where for each Cell can be set independently the High Cut frequency and the Q. More precisely, the available independent parameters for setting are the following:

1. Customm_2nd: builded using 1 IInd order Cell, where High Cut Frequency and Q can be set
2. Customm_3rd: builded using 2 IInd order Cell, where High Cut Frequency can be set on both the cascaded Cells and the Q on the second one
3. Customm_4th: builded using 2 IInd order Cell, where High Cut Frequency and the Q be set on both the cascaded Cells.

The following is an example of a LPF sub-menu screen with the filter set at 400Hz as Custom_4th on Output1… using the name "Low" (see later for assigning a Name to the outputs):

Out-1	Low	LPF
->Custom_4th	F = 400Hz	

From this Page, to access the cascaded IInd order Cells, it is necessary to rotate the NAV/PM1 encoder Clockwise or Counterclockwise.
The number of accessible IInd order Cells is depending from the Custom Filter order: Custom_2nd will allow the editing of just one IInd order Cell, Custom_3rd and Custom_4th, the access to 2 IInd order Cells.
In the previous example, rotating Clockwise the NAV/PM1 encoder, we can access the Filt1 (Cell1) and Filt2 (Cell2) pages, for the Cells High Cut Frequency and Q settings.
When within the Filt1 editing Page, in example:

Out-1	Low	LPF
->Filt1	F = 400Hz	Q = 0.7

And we can chose a different setting within the Filt2 page:

Out-1	Low	LPF
->Filt2	F = 400Hz	Q = 1.5

The filter's Frequency can be set already within these editing pages using the PM2 encoder, but here is for Frequency "fine tuning" being the Frequency increment/decrement done by 1Hz steps.
For a quick High Cut Frequency setting, need to press the ENTER Button for accessing the High Cut Frequency Fast Setting Page.

Out-1	Low	LPF
->Edit Freq =	400Hz	

"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz.
Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Note1: once the desired options have been selected using the 2 encoders, they are automatically saved as current and stored in the DPA480 system status once leaving the page.
Note2: to exit this page, push the "ESC" button.

EQ Byp page – from this sub-menu it is possible to Bypass or to make active the 5 Bands Equalizer placed on the Output Signal Path.

Out-1	Name	EQ Byp
Eq Bypass =	Off	

When Bypassed the 5 Bands Equalizer, its current setting will not be lost.

EQ: [x] sub-menu – from this sub-menu it is possible to set the Output Channels five available Multi-Type Filters. Anyone of the 5 filters of the Eq can be selected choosing from the list of filter types shown already at the "Input Path" section [Peaking_Eq, Hi-Shelv_1, Hi-Shelv_2, Hi-Shelv_Q, Lo-Shelv_1, Lo-Shelv_2, Lo-Shelv_Q, Low Pass_1, Low Pass_2, Low Pass_Q, High Pass_1, High Pass_2, High Pass_Q, All Pass_1, All Pass_2, Band Pass, Notch Filt]

More, the DPA480 Is giving the possibility to "Bypass" any single filter of the 5 available in the Equalizer section; Once in the editing page of the single filter, a "Byp" field is available for making the single filter active or not

```
Out-1      Name    EQ-X
Byp=Off    Type=Peaking_Eq
```

Pushing the Enter Button, the above window will allow the access to the "Byp" and "Type" fields.

```
Out-1      Name      EQ-X
->Byp=Off  Type=Peaking_Eq
```

Using the PM2 encoder, the selected Filter can be activated or bypassed.

The DPA480 allows the user to select anyone of the filter's type listed above and assign them independently using the 5 available filters.
In order to select the filter's type, it is necessary to use the PM3 encoder, rotate it "clockwise" or "counter-clockwise" to select the desired filter.
So, in order to define the filter type for the filter number 1 ("x"=1), it is necessary from the above screen, to select the filter, which name will appear on the screen.
If selected a Peaking_Eq filter, then the display will be as follow:

```
Out-1      Name        EQ-1
->Byp=Off  Type=Peaking_Eq
```

Once selected the desired Filter Type, its parameters can be accessed for editing just pressing again the ENTER Button.
Once pressed the ENTER Button, the editing page of the selected filter type will be accessed ONLY if the selected filter it is not set in Bypass mode.
Depending from the selected filter, the related parameters will be available for editing

Peaking_Eq Filter: Peaking filters are at constant Q, so with Q not depending from the selected Gain value
If we selected a Peaking_Eq filter within EQ-1, then the Q has to be set at a desired value of say 1.00 using the PM3 encoder, the GAIN at say +3dB using the PM2 encoder and the center Frequency at say 1.00KHz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

```
Out-1      Name        EQ-1
->1.00kHz  +3.0dB      Q=1.00
```

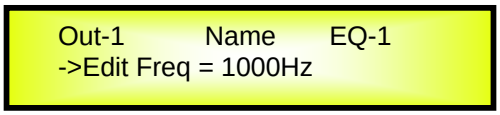
Once in the Peaking_Eq Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Filter's Center Frequency, Gain and Q:
"***Center Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable Gain range is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

```
Out-1      Name        EQ-1
->Edit Freq = 1000Hz
```

Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

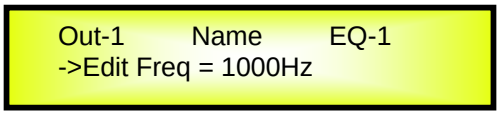
Hi_Shelv_1/2 Filter: These Shelving filters present 3dB less than the selected Gain, or 3dB more than the selected Attenuation, at the selected cutting frequency, and a slope of 6dB/Oct-12dB/Oct.
If we selected a High Shelving filter of the 1st/2nd order within EQ-1, then the GAIN has to be set at a desired value of say +3dB using the PM2 encoder and the Lo Cut Frequency at say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

Once in the Hi-Shelv_1/2 Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM2" encoders for editing the Filter's Low Cut Frequency and Gain:
"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable range of the Gain is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



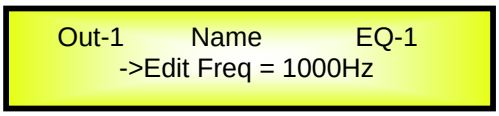
Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.
Hi_Shelv_Q Filter: These Symmetrical Shelving filters present ½ level of the selected Gain/Attenuation at the selected cutting frequency, and a slope that is depending from the chosen Q value.
If we selected a High Shelving filter with variable Q within EQ-1, then the GAIN has to be set at a desired value of say +3dB using the PM2 encoder, the Q at 3.5 and the Lo Cut Frequency at say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

Once in the Hi-Shelv_Q Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Filter's Low Cut Frequency, Gain and Q:
"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable range of the Gain is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.
Lo_Shelv_1/2 Filter: These Shelving filters present 3dB less than the selected Gain, or 3dB more than the selected Attenuation, at the selected cutting frequency, and a slope of 6dB/Oct-12dB/Oct.
If we selected a Low Shelving filter of the 1st/2nd order within EQ-1, then the GAIN has to be set at a desired value of say +3dB using the PM2 encoder and the High Cut Frequency at say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

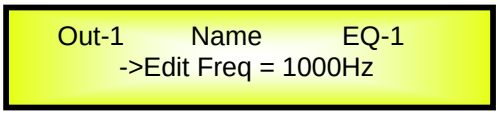
Once in the Lo-Shelv_1/2 Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM2" encoders for editing the Filter's High Cut Frequency and Gain:
"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable range of the Gain is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Lo_Shelv_Q Filter: These Symmetrical Shelving filters present ½ level of the selected Gain/Attenuation at the selected cutting frequency, and a slope depending from the chosen Q value.
If we selected a Low Shelving filter with variable Q within EQ-1, then the GAIN has to be set at a desired value of say +3dB using the PM2 encoder, the Q at 3.5 using the PM3 and the Hi Cut Frequency at say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

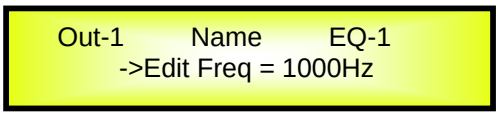
Once in the Lo-Shelv_Q Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Filter's High Cut Frequency, Gain and Q:
"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable range of the Gain is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Low Pass_1/2 Filter: These Low Pass filters present -3dB at the selected cutting frequency, and a slope of 6dB/Oct-12dB/Oct.
If we selected a Low Pass filter of the 1st/2nd order within EQ-1, then High Cut Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

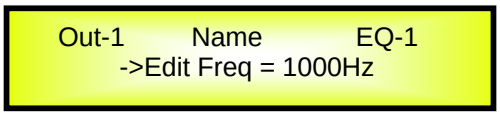
Once in the Low Pass_1/2 Filter's edit screen, the "NAV/PM1" encoder can be used for editing/modifying the Filter's High Cut Frequency:
"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Low Pass_Q Filter: The Gain of these Low Pass filters can be modified at their cutting frequency corner depending from the value assigned to the Q parameter.
If we selected a Low Pass filter with variable Q within EQ-1, then High Cut Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder and the Q at 3.5 using the PM3 encoder; the EQ sub-menu screen will show the following:

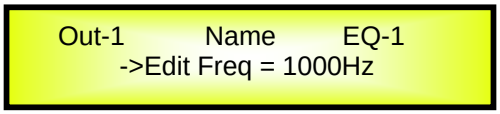
Once in the Low Pass_Q Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM3" encoders for editing the Filter's High Cut Frequency and Q:
"***High Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

High Pass_1/2 Filter: These High Pass filters present -3dB at the selected cutting frequency, and a slope of 6dB/Oct-12dB/Oct.
If we selected a High Pass filter of the 1st/2nd order within EQ-1, then Low Cut Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

Once in the High Pass_1/2 Filter's edit screen, the "NAV/PM1" encoder can be used for editing/modifying the Filter's Low Cut Frequency:
"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:

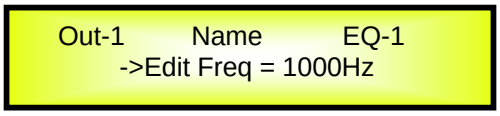


Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

High Pass_Q Filter: The Gain of these High Pass filters can be modified at their cutting frequency corner depending from the value assigned to the Q parameter.
If we selected a High Pass filter with variable Q within EQ-1, then Low Cut Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder and the Q at 3.5 using the PM3 encoder; the EQ sub-menu screen will show the following:

Once in the High Pass_Q Filter's edit screen all the filter's parameters can be modified using the "NAV/PM1" and "PM3" encoders for editing the Filter's Low Cut Frequency and Q:
"***Low Cut Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.

When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

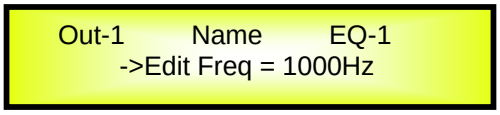
All Pass_1 Filter: Filters allowing a FLAT Amplitude response and adding a 90 Degree Phase rotation at the selected Frequency.

If we selected a All Pass filter of the 1st order within EQ-1, then Phase Rotation Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

Once in the All Pass_1 Filter's edit screen, the "NAV/PM1" encoder can be used for editing/modifying the Filter's Phase Rotation Frequency:

"***Phase Rotation Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.

When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

All Pass_2 Filter: Filters allowing a FLAT Amplitude response and adding a 180 Degree Phase rotation at the selected Frequency.

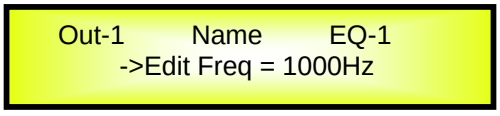
If we selected a All Pass_2 filter, with variable Q, within EQ-1, then Phase Rotation Frequency has to be set at a desired value of say 1000Hz with the NAV/PM1 encoder and the Q at 3.5 using the PM3 encoder; the EQ sub-menu screen will show the following:

Once in the All Pass_2 Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM3" encoders for editing the Filter's Phase Rotation Frequency and Q:

"***Phase Rotation Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.

"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.

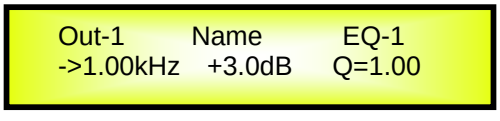
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



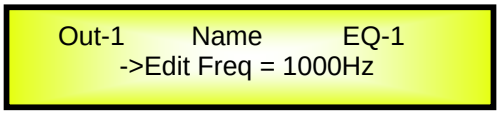
Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Band Pass Filter: Filters allowing to pass the band "around" the selected frequency; the amount of passing band is decided by the Q value

If we selected a Band Pass filter within EQ-1, then the Q has to be set at a desired value of say 1.00 using the PM3 encoder, the GAIN at say +3dB using the PM2 encoder and the center Frequency at say 1.00KHz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:



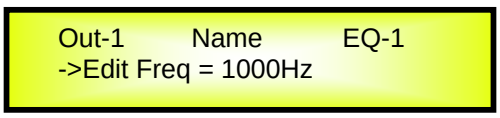
Once in the Band Pass Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Filter's Center Frequency, Gain and Q:
"***Center Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Gain***": the selectable Gain range is from -15dB to +15dB in steps of 0.5 dB and can be adjusted by rotating the "PM2" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

Notch Filt Filter: Filters canceling the band "around" the selected frequency; the amount of canceled band is decided by the Q value
If we selected a Notch Filt filter within EQ-1, then the Q has to be set at a desired value of say 1.00 using the PM3 encoder and the Notch Frequency at say 1.00KHz with the NAV/PM1 encoder; the EQ sub-menu screen will show the following:

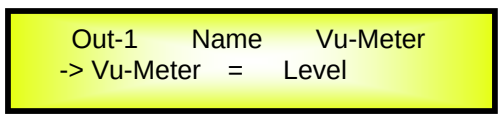
Once in the Notch Filt Filter's edit screen, all the filter's parameters can be modified using the "NAV/PM1" and "PM3" encoders for editing the Filter's Notch Frequency and Q:
"***Notch Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1Hz and can be adjusted by rotating the "NAV/PM1" encoder.
"***Q***": the selectable Q range is from 0.3 up to 20.0 in steps of 0.1 and can be adjusted by rotating the "PM3" encoder.
When in the Parameters Editing Page, pushing once more the ENTER Button, it is possible to access the page of the Frequency Fast Setting:



Here, the NAV/PM1" encoder will increment/decrement the Frequency value by step of one thousand Hz, the PM2 by steps of one hundred Hz and the PM3 by steps of one Hz.

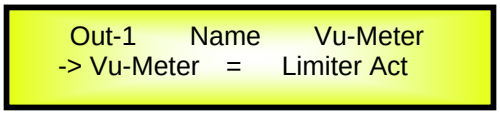
Note1: once the desired options have been selected using the 3 encoders, they are automatically saved as current and stored in the DPA480 system status once leaving the page.
Note2: to exit this page, push the "ESC" button.

Vu-Meter page – from this page it is possible to select what is shown on the Output LED meters, by using the "PM2" or "PM3" encoders.
The outputs' LED meters can show the Output signal LEVEL, the Output RMS Compressor's activity or the Output Peak Limiters' activity.
When the Output signal Level is selected, the LED meters will show, from bottom up, the Level of the signal:



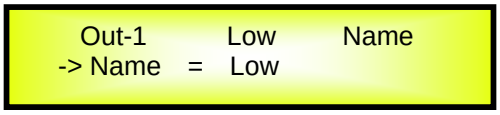
When the RMS Compressor's activity is selected, the LED meters will show, from top down, the activity of the RMS Compressor Limiter on the output

When the Peak Limiter's activity is selected, the LED meters will show, from top down, the activity of the Peak Limiter on the output

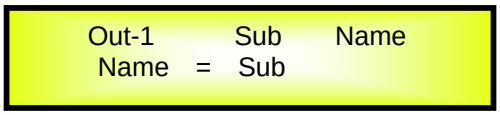


Name page – from this screen it is possible to assign a 6 character name to the Output Channel.
The following is an example screen for a "Name" page labeled "Low" for Output Channel 1:

To Edit press ENTER on the Name Page and the entering arrow will appear as in the example below:



The first letter position will be blinking.
Select the Character position from the 6 available by rotating the "NAV/PM1" encoder, then by using the "PM2" or 'PM3" encoder it is possible to select the desired character.
Once you are happy with your name selection, press "ENTER" to confirm the edited Name. The new name will be stored. The following example shows "Sub" replacing our previous name of "Low":



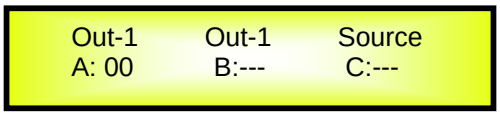
Source page – from this page it is possible to assign anyone of the Inputs to any Output Channel with the desired percentage of level, as in 4 channel mixer:

1. Input A with x% or Muted
2. Input B with y% or Muted
3. Input C with k% or Muted
4. Input D with z% or Muted

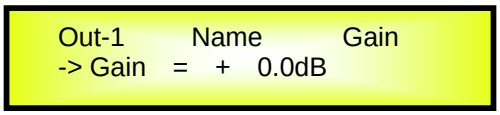
In order to select the Inputs to assign to the the output and its percentage, need to access the Source Page Sub Menu pressing ENTER, then selecting with the PM1 encoder the Input to assign or Mute and with the PM2 and PM3 encoders, if to MUTE that input (PM2) or to assign with the desired percentage from -30dBu (min level) up to 00dBu (max) with the PM3.
Assigning ONLY the Input A, in example, with full amplitude to the output 1, the LCD will appear as follow for the In-A Sub Menu:

And as follow for the Sub Menu related to the other Inputs and accessed through the PM1 encoder:

Once back to the Main Source Page after the above selection, the screen will appear as follow:



Gain page – from this screen it is possible to set the Output Channels Level from -18dB to +18dB, press ENTER an arrow will appear on the left of the screen "**->**" then use the "PM2" or "PM3" buttons.
The value set on this screen will only affect the input level of the selected Channel 1/2/3/4/5/6/7/8.
The following is an example screen for the "Gain" page where the Gain of the Output Channel 1 is set to +0.0dB



RMS Cmp sub-menu [1/2] – from this page it is possible to set the Threshold and Ratio parameters of the Output Channels RMS Compressor.
The following is an example screen for the RMS Compressor [1/2] page where the Threshold of the RMS Compressor is set at +5dBu and the Ratio at 2:1

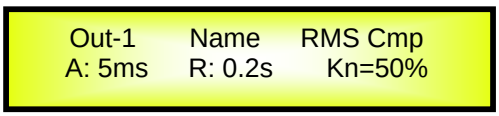
Once pushing ENTER the RMS Compressor's parameters can be modified using the "PM2" and "PM3" encoders for editing the Threshold and the Ratio.
Once pushing ENTER the above screen will change as follows:

As said, the Threshold and Ratio can be edited using the "PM2" and "PM3" encoders.

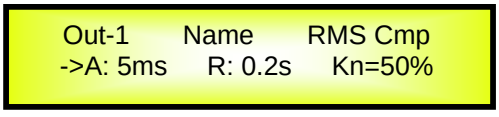
"***Threshold***": the selectable range of the RMS Compressor's Threshold is from +20dBu (OFF) to -10dBu in steps of 0.2dBu
The Threshold can be adjusted by rotating the "PM2" encoder.
"***Ratio***": the selectable range of the RMS Compressor's Ratio is from 1:1 (Off) up to 32:1 (Lim) in steps of 1 and can be adjusted by rotating the "PM3" encoder.

Note: The RMS Compressor Threshold is defined in dBu, due to the fact that with both, Sinusoid and Squared wave testing signals, the DPA480 compressed output dBu (RMS) Level is the same and matching the selected one.

RMS Cmp sub-menu [2/2] – from this page it is possible to set the Attack Time. Release Time and "Knee" type of the Output Channels RMS Compressor.
The following is an example screen for the Limiter page where the Attack Time of the RMS Compressor is set at 5ms, the Release Time is set at 0.2Sec and the Knee type is at the 50% between the HARD (000%) and the SOFT (100%) one:



Once pushing ENTER the RMS Compressor's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the RMS Compressor's Attack Time [A]., Release Time [R] and Knee type.
Once pushing ENTER the above screen will change as follows:



The Attack Time [A] can be edited using the "NAV/PM1" encoder, the Release Time [R] the "PM2" encoder and the Knee type the "PM3" encoder.

"***Attack Time [A]***": the selectable range of the RMS Compressor's Attack Time is from 5ms to 200ms in steps of 1ms - from 5ms to 20ms then 5ms - from 20ms to 30ms then 10ms - from 30ms to 100ms and 20ms - from 100ms to 200ms.
The Limiter's Attack Time can be adjusted by rotating the "NAV/PM1" encoder.
"***Release Time [R]***": the selectable range of the RMS Compressor's Release Time is from 0.1s to 3s in steps of 0.1s and can be adjusted by rotating the "PM2" encoder.
"**Hard/Soft Knee*"***: the selectable range of the RMS Compressor's Knee type is from 000% (Hard) up to 100% (Soft) and can be adjusted by rotating the "PM3" encoder.

Peak Limiter sub-menu – from this page it is possible to set the Output Channels Peak Limiter.
The following is an example screen for the Peak Limiter page where the Attack Time of the Peak Limiter is set at 5ms, the Release Time is set at 0.2Sec and the Peak Limiter Active Threshold is set at +15dB:

Out-1	Name	Limiter
A: 5ms	R: 0.2s	+15.0dB

Once pushing ENTER the Peak Limiter's parameters can be modified using the "NAV/PM1", "PM2" and "PM3" encoders for editing the Peak Limiter's Attack Time [A]., Release Time [R] and Active Threshold.
Once pushing ENTER the above screen will change as follows:

Out-1	Name	Limiter
-> A: 5ms	R: 0.2s	+15.0dB

The Attack Time [A] can be edited using the "NAV/PM1" encoder, the Release Time [R] the "PM2" encoder and the Peak Limiter Active Threshold the "PM3" encoder.

"***Attack Time [A]***": the selectable range of the Peak Limiter's Attack Time is from 5ms to 200ms in steps of 1ms - from 5ms to 20ms then 5ms - from 20ms to 30ms then 10ms - from 30ms to 100ms and 20ms - from 100ms to 200ms.
The Limiter's Attack Time can be adjusted by rotating the "NAV/PM1" encoder.
"***Release Time [R]***": the selectable range of the Peak Limiter's Release Time is from 0.1s to 3s in steps of 0.1s and can be adjusted by rotating the "PM2" encoder.
"**Limiter Active *Threshold*"**: the selectable range of the Peak Limiter's Threshold is from +20dB (Limiter not active) to -10.0dB in steps of 0.2 dB and can be adjusted by rotating the "PM3" encoder.

Note: The Peak limiter Threshold is defined in Vp, due to the fact that with both, Sinusoid and Squared wave testing signals, the DPA480 Peak Limited output Vp (Peak-Peak) Level is the same and matching the selected one.

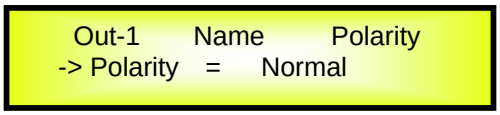
Note1: once the desired options have been selected using the 3 encoders, they are automatically saved as current and stored in the DPA480 system status once leaving the page.
Note2: to exit this page, push the "ESC" button.

Delay page – from this page it is possible to set the Output Channels Delay Time from 000.0000mS up to 848.9984mS, by steps of 1mS or 20.8uS.
To set the Delay time press ENTER an arrow will appear on the left of the screen "**->**". then use the "PM2" encoder to set the Delay Time in steps of 1mS and the "PM3", for setting the "fine" Delay Time in steps of 20.8 microseconds.
The following is an example screen for the "Delay" page where the Delay Time of Output Channel 1 is set to 160.1872mS:

Out-1	Name	Delay
-> Delay	=	160.1872mS

Polarity page – from this page it is possible to set the Output Channels Polarity, by using the "PM2" or "PM3" encoders.
The polarity can be "Normal" or "Inverted" (which means rotated of 180 Degrees).

The following is an example of a "Polarity" screen where the Polarity of Output Channel 1 is set to "Normal"



Input and Output Channels Last Edited Parameter Return Function

Once you have escaped out of parameter editing within the individual Input or Output channels the DPA480 will remember this last editing action on that Channel. When you return for your next editing action pressing the EDIT button on that channel will immediately return you to the screen related to this last editing action.

This function makes fine tuning or modifying easier when it is necessary to make a number of adjustments to the same parameter in a short time sequence.

Input Channels and output Channels LINK Function

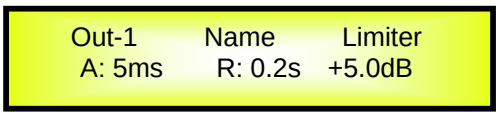
The DPA480 is able to perform a unique LINK MODE between Input Channels as well as a link between Output Channels to enable quick and immediate editing (you cannot link output to input channels).

To link channels when editing, you will need to select a "Master" channel that will be the one to be edited and have it's parameters displayed on the LCD screen. You can then select and link other channels (Slaves) that you wish to apply the same changes to.

To enter a link mode session, select the Master channel Edit mode, then link the Slaves by pressing their related Edit buttons.
All Linked channels will be selected ready for adjustment when their "Blue" LED is lit in the Editing mode.
Now all Slave channels and only those selected will modify their parameters accordingly as you edit the Master channel.
All other existing parameters will stay the same within the Slave Channels unless edited by this link with the Master channel.

Note: The LINK function is NOT a COPY function.

If we want to edit the limiter of the Output channels 1/2/4, we can enter the editing mode of Output Channel 1 by pressing the related Edit button and turning on the Blue LED below the Output Channel 1 LED meters. This assigns the "role" of Master and displays this channel's parameters on the LCD:



Then press the Edit button of Output Channels 2/4, turning on their related "Blue" LED's. Now all parameters edited on Output Channel 1, will also be applied to channels 2 and 4.
If we want to remove one of the linked channels from the Link, press the related Edit button.
Exiting the editing of the Master channel during a Link session will automatically terminate that session. The Link will also be automatically terminated if, during the editing of Output Channels you jump across to begin editing an Input channel or vice versa.

Factory Reset

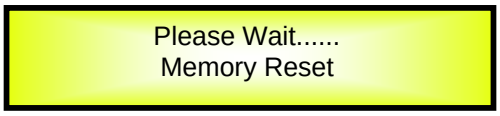
In the event of the password being lost or any other reason the user may require the unit to be reset to the original factory settings, a "Factory Reset" that will clear all settings of the DPA480 and return the device to the original factory setting, is available to the user.

Note: Continuing with this process will mean the DPA480 will re-initialize to the original factory settings and any previously stored information and changed parameters will be permanently lost.

Note1: Together with the all information, also the current password will be lost after a "Factory Reset" and will be replaced with the Factory one: "000000".
In case the customer forgot the password and need to reinitialize it, can use the "Factory Reset" to put the Password at its original "000000" value.

Use the following procedure to perform the factory reset:

1. While the DPA480 is switched OFF, simultaneously press the ENTER+ESC+UTILITY buttons on the front panel.
2. Maintain pressure on all three buttons as you turn the power switch to On and the following LCD screen appears on the DPA480:



3. Release the buttons and wait for the DPA480 to re-initialize.

Once completed, the DPA480 will resume regular operation as though it was a new unit from the factory and no previously programmed parameters will be available for use.

GND and USB LIFT switches

The DPA480 on its back panel is providing a couple of switches allowing to connect or left unconnected the power Supply Main GND and the USB connectors GND to the chassis.

MAIN "LIFT/GND" Switch - Actually can happen that sometime it is necessary to NOT connect the Main Ground to the Chassis in order to avoid GND loops.
This is possible using the "MAIN" GND/LIFT switch.
When the switch is positioned on GND, the Main Power Supply GND is connected to the Chassis.

USB and RS485 "LIFT/GND" Switch – When using a USB or RS485 remote control connection, can be that the GND of the USB ocable it is not connected to the remote controller GND.
In this case it is necessary to provide it from the processor's side, and this can be done selecting the GND position with the USB/RS485 switch.
On the other hand, if the GND of the USB or RS485 cable is already connected to the remote controller GND, to connect the same ground also to the GND of the processor could create GND loops or generate GND noises.
In this case, the switch on the position "Lift" will leave the cable GND not connected to the chassis of the DPA480

USB Remote Control protocol for Presets Changing and Gain/Volume controls

The following is the HEX Code for controlling the DPA480 recall presets and master volume control:

Preset Changing:

CMD_RECALL_PRESET: CMD=1BH

A. The User has to send the following Command, including the number of the preset to load on the unit:

TX:

STX	ID_M	ID_N	CMD	D0	D1	D2	D3	D4	D5	D6	D7	ETX
F0H	C3H	XX	1BH	NPreset	00H	00H	00H	00H	00H	00H	00H	F7H

XX = 0,..,31 (ID device)
Npreset=0,...,23 Presetnumber

The DPA480's microcontroller will check if the Preset is initialized (available or not yet created...)

B. If YES, then the microcontroller will send back to the User (eg Crestron/AMX Remote Control..) the same frame used by the command

RX:

STX	ID_M	ID_N	CMD	D0	D1	D2	D3	D4	D5	D6	D7	ETX
F0H	C3H	XX	1BH	NPreset	00H	00H	00H	00H	00H	00H	00H	F7H

So in this case, if the user gets back EXACTLY what was sent, the preset is existing and loaded on the unit.

C. If the preset that the user wanted to load is NOT YET INITIALIZED (not yet created, so not available...). the microcontroller will notify that to the user, sending back the following frame:

RX:

STX	ID_M	ID_N	CMD	D0	D1	D2	D3	D4	D5	D6	D7	ETX
F0H	C3H	XX	1BH	**FFH**	00H	00H	00H	00H	00H	00H	00H	F7H

Input Gain and Output Volume Control:

UPDATE GAINS-PHASE: CMD=01H

A. The User has to send the following Command, including the value to be assigned to "Vol", for modifying the Input Gain (Chn = 0, 1, 2, 3) or the Output Volume (Chn = 2, 3, 4, 5, 6, 7, 8, 9).
Also the Output signal Phase can be modified:

TX:

STX	ID_M	ID_N	CMD	D0	D1	D2	D3	D4	D5	D6	D7	ETX
F0H	C3H	XX	01H	Chn	00H	00H	00H	00H	00H	Phs	Vol	F7H

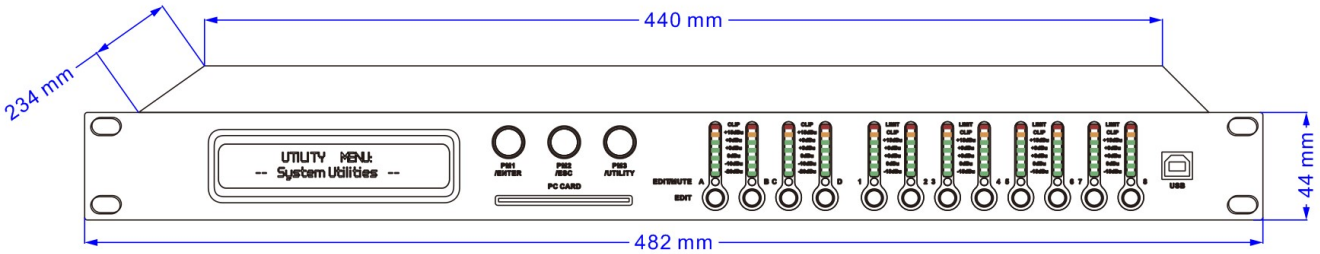
XX = 0,..,31 (ID device)
Chn=0,...,7: Channel selected, 0, 1, 2, 3=In1, In4; 2,...,9=Out1,..,Out8; when Channel 0, 1, 2, 3 selected, then Vol=Input Gain, when Channel 2, 3, 4, 5, 6, 7, 8, 9 selected, then Vol= Output Vol.
Phs= Phase only if the Chn>1; Value=0, 1 where 0=direct, 1=inverse (180°)
Vol= Gains from 0 to 180 (-12dB/ +6dB step 0.1dB)

B. If the command has been properly executed and the Gain/Volume modified, then the microcontroller will send back to the User (eg Crestron/AMX Remote Control..) the same frame used by the command:

RX:

STX	ID_M	ID_N	CMD	D0	D1	D2	D3	D4	D5	D6	D7	ETX
F0H	C3H	XX	01H	Chn	00H	00H	00H	00H	00H	Phs	Vol	F7H

Product Dimension



DPA480 Technical Specifications

The DPA480 Digital Speaker Processor is based on a powerful analog and digital Dual DSP platforms having the following specifications

Analog Input Signal:	ChA/ChB/ChC/ChD	Bal. Female XLR
Maximum Input Level:	+20dBu	
Analog Output Signal:	Ch1/Ch2/Ch3/Ch4/Ch5/Ch6/Ch7/Ch8	Bal. Male XLR
Maximum Output Level:	+20dBu	
Digital Processing (DSP):	2xSAM3716, 24bits (data) x 96 bits (coeff.)	
A/D Converters:	AKM5388, 24bits	
D/A Converters:	4xAKM4396, 24bits	
Sampling Frequency:	48kHz	
S/PDIF Stereo Digital Input:	32kHz, 44.1kHz and 48kHz Sources Accepted	
S/N:	110dBA	
THD+N:	0.005%	
Frequency Response (Bypass):	20Hz – 20kHz (+- 1 dB)	
Power Supply:	Switching Power Supply	
Remote Control:	USB, RS485, TCP/IP	

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